

中国石杉属(狭义)小杉兰组的分类学研究*

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A TAXONOMIC STUDY OF *HUPERZIA* BERNH. (s. s.) SECT. *HUPERZIA* IN CHINA

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Abstract The fern-allied genus *Huperzia* Bernh. (sen. str.) is divided into two sections: Sect. *Huperzia* and Sect. *Serratae* (Rothm.) Holub. The circumscription of Sect. *Huperzia* is revised. The classification of this section in China is presented. Twelve species and one variety are recognized here, including one new combination, *H. quasipolytrichoides* (Hayata) Ching var. *rectifolia* (J. F. Cheng) H. S. Kung et L. B. Zhang, two new synonyms, *H. hupehensis* Ching and *H. whangshanensis* Ching et P. C. Chiu.

Key words *Huperzia*; Infrageneric classification; Sect. *Huperzia*; Revision; Taxonomy; China

J. G. Baker (1887) was working on the infrageneric classification of *Lycopodium* (s. l.) in his book "Handbook of the Fern Allies". Under his subgenus *Selago*, the group of *Lycopodium selago* includes some taxa of *Huperzia* Bernh. and *Phlegmariurus* (Herter) Holub.

W. Herter paid some attention to the infrageneric classification of *Lycopodium* L. (s. l.) as well. In 1909, he proposed 4 series under his Subgen. *Urostachys* Herter sect. *Selaginurus* Herter, namely Ser. *Selagina* Herter, Ser. *Serrata* Herter, Ser. *Everettia* Herter and Ser. *Hamiltonia* Herter, of which, Ser. *Selagina* together with Ser. *Serrata* corresponds to modern conception of *Huperzia* (s. s.). According to modern view, it can be inferred that Ser. *Selagina* and Ser. *Serrata* be the natural taxa. But it is a pity that all of the taxa under the section in W. Herter's system (1909) were not formally described.

Based on the species *Huperzia selago* (L.) Bernh., the type species of the genus *Huperzia* Bernh., W. Rothmaler (1944) proposed a new section, Sect. *Plananthus* (Gray) Rothm. (nom. superfl.), under which Subsect. *Euselago* (Pritzel) Rothm. was also put forward by him with the same type species. The subsection includes two series, namely Ser. *Selaginae* Rothm. ("Selagina" Herter) and Ser. *Serrata* Rothm. ("Serrata" Herter). The former refers to the species that have entire or denticulate leaves, while the latter includes those with leaves serrate on the margin.

In 1991, J. Holub upgraded Ser. *Serratae* Rothm., one of the above two series, to

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Sect. *Serratae* (Rothm.) Holub. Therefore the others of *Huperzia* (s. s.) should be classified automatically to Sect. *Huperzia*.

China is an important distributional area of *Huperzia* Bernh. Having finished the taxonomical study on the Chinese taxa, we think that the two above key systems (W. Rothmaler, 1944 and J. Holub, 1991) are not fully adequate. Here, we divide *Huperzia* Bernh. (s. s.) still into two sections, Sect. *Huperzia* and Sect. *Serratae* (Rothm.) Holub, but with different circumscription: Sect. *Huperzia* owns entire leaves, whereas Sect. *Serratae* (Rothm.) Holub possesses serrate or denticulate leaves.

Key to sections

1. Leaves serrate or denticulate 1. Sect. ***Serratae*** (Rothm.) Holub
1. Leaves entire 2. Sect. ***Huperzia***

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Huperzia Bernh. sect. ***Huperzia***, Holub in Folia Geobot. Phytotax. 26: 85. 1991.

Huperzia Bernh. sect. *Plananthus* (Gray) Rothm. subsect. *Euselago* (Pritzel) Rothm. ser. *Selaginae* Rothm. in Fedd. Repert. Sp. Nov. 54: 59. 1944, p. p.

Lycopodium subgen. *Urostachys* sect. *Selaginurus* Herter ser. *Selaginae* ("Selagina") Herter in Bot. Jahrb. 43(98): 31. 1909, nom. nud.

Typus: *Huperzia selago* (L.) Bernh. ex Schrank et Matt.

Folia margine integra.

Distributed in Europa, Asia and America; 12 species in China.

Key to Species in China

1. Bases of leaves evidently the broadest part of the leaf.
 2. Branches with leaves 0.5~1.3 cm broad; leaves lanceolate or subulate, 4~6 mm long, straight or incurvate, erect non reflex.
 3. Leaves straight, lanceolate or subulate.
 4. Leaves sparse, lanceolate c. 1.2 mm broad at base, ascending 1. 中华石杉 *H. chinensis*
 4. Leaves dense linear-subulate c. 0.8 mm broad at base, vague 2. 东北石杉 *H. miyoshiana*
 3. Leaves more or less incurvate, narrow lanceolate, 6 mm long 3. 南川石杉 *H. nanchuanensis*
 2. Branches with leaves 1.7~2.0 cm broad; leaves subulate, falcate, reflex 4. 曲尾石杉 *H. bucahwangensis*
1. Bases of leaves slightly narrower than the broadest part of the leaf or about the same as it.
 5. Small plants generally less than 10 cm high; leaves below 2~5 (~6) mm in length.
 6. Leaves plane, 2~5 (~6) mm long, ascending 5. 西藏石杉 *H. tibetica*
 6. Leaves slightly incurved, vaulted on the back.
 7. Leaves ascending, appressed, c. 1 mm broad 6. 伏贴石杉 *H. appressa*
 7. Leaves spreading, 0.5~0.7 mm broad 7. 相马石杉 *H. somai*
 5. Larger plants 9~25 cm high; largest leaves over 8 mm long.
 8. Stem reddish 8. 红茎石杉 *H. rubicaulis*
 8. Stem green.
 9. Small plants, leaves lanceolate or linear, narrower than 1.2 (~1.4) mm broad, acuminate, thin coriaceous or chartaceous.
 10. Leaves chartaceous, vague.
 11. Leaves lanceolate c. 1 mm broad 9. 雷波石杉 *H. laipoensis*
 11. Leaves linear, evidently narrower than 1 mm 10. 峨眉石杉 *H. emeiensis*

10. Leaves reflex or descending, thin coriaceous.
 12. Leaves slightly incurve, reflex
 11a. 金发石杉 *H. quasipolytrichoides* var. *quasipolytrichoides*
 12. Leaves straight, slightly descending 11b. 直叶金发石杉 var. *rectifolia*
 9. Larger plants to 25 cm high, leaves elliptico-lanceolate, 1.5~1.8 mm broad, acute
 12. 小杉兰 *H. selago*

1 中华石杉

Huperzia chinensis (Christ) Ching in Acta Bot. Yunnan. 3(3): 304. 1981; H. S. Kung, Fl. Sichuan. 6: 28, f. 2: 4~6. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 11. 1989.

Lycopodium chinense Christ in Nuov. Giorn. Bot. Ital. n. ser. 4(1): 101, t. 3, f. 4. 1897; Herter in Engl. Bot. Jahrb. 43: Beibl. 98: 22. 1909; 傅书遐, 中国主要植物图说——蕨类植物门 3. 1957; Y. L. Chang et al., Sporae Pterid. Sin. 39, pl. 1: 14~17. 1976; H. S. Kung in Acta Phytotax. Sin. 18(2): 234, f. 1: 1. 1980; B. Ollg. Index Lycop. 37. 1989. TYPE: China. Shaanxi, Mt. Taibai, J. Girald s. n. (K)

Urostachys chinensis (Christ) Herter ex Nessel, Bärappg. 27. Abb. 4, f. 2. 1939.

H. takingensis Ching, l. c. 300; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 21. 1989. TYPE: China. Sichuan, Dajing, alt. 4200 m, Li Xing 77835(PE).

Shaanxi (陕西): Mt. Taibai(太白山), X. Z. Zhang et al. (张学忠等) 1305(PE).
Sichuan (四川): Jinchuan(金川), X. Li(李馨) 77835; Shimian(石棉), L. B. Zhang(张丽兵) 2021(CDBI).

Distribution Shaanxi and Sichuan Provinces; alt. 2000~2400 m; in crevices on grass slopes.

The concept of this species was enlarged in the past, including *Lycopodium miyoshianum* and other relatives, such as *L. emeiense*, etc.

2 东北石杉

Huperzia miyoshiana (Makino) Ching in Acta Bot. Yunnan. 3(3): 303. 1981; S. X. Li et J. Z. Wang in S. X. Li, Fl. Liaoning. 1: 11, pl. 1: 4~5. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 17. 1989; J. Z. Wang in Journ. Hebei Forest. Coll. 5(2): 114. 1990; Nakaike, N. Fl. Jap. Pterid. rev. enlarg. 792. 1992; Brunton in Amer. Fern Journ. 82(2): 63~66. 1992.

Lycopodium miyoshianum Makino in Bot. Mag. Tokyo 12: 36. 1898; B. Ollg. Index Lycop. 57. 1989. TYPE: Japan. Honshu, M. Miyoshi s. n. (TI).

L. selago L. var. *miyoshianum* (Makino) Makino, l. c. 16: 199. 1902.

L. tenuifolium Herter in Bot. Jahrb. 43: 41. 1909. SYNTYPE: Japan. Faurie s. n.

Urostachys miyoshianus (Makino) Herter ex Nessel, Bärappg. 28. 1939; B. Ollg. Index Lycop. 96. 1989.

U. miyoshianus var. *coreanus* (Hayata) Herter ex Nessel, Bärappg. 28, Abb. 4, f. 5. 1939; Nakaike in J. Nat. Hist. Mus. Inst. Chiba 4(1): 12. 1996. TYPE: Korea. Faurie 3.

H. miyoshiana (Makino) Ching var. *coreana* (Hayata) Ching, l. c. 304; Nakaike in J. Nat. Hist. Mus. Inst., Chiba 4(1): 12. 1996.

L. chinense auct non Christ: 刘慎谔等, 东北草本植物志 1: 7, 图 2. 1958; Tagawa, Coll. Ill. Jap. Pterid. 8, pl. 1~3, f. 1: 3. 1959; Nakaike, New Fl. Jap. Pterid. 16, f.

16a, 16b. 1982; Iwatsuki, Ferns Fern Allies Jap. 44. 1992.

Heilongjiang(黑龙江): Mt. Xiaobai(小白山), H. W. Kung(孔宪武)2217; Yichun(伊春), T. N. Liou *et al.*(刘慎谔等)7897(PE). **Jilin**(吉林): Songhua Riv. Exp.(松花江队)316; Mudanjiang(牡丹江), G. Sato 7543; Mt. Changbai(长白山), A. G. Gu(谷安根)305(PE), J. J. Qian(钱家驹)466(KUN).

Distribution Northeast China; alt. 1000~2200 m; in moist soil under forest or in mosses. Also in Korea, Japan and Northeast America.

Some pteridologists (K. Iwatsuki, 1992; T. Nakaike, 1982; M. Tagawa, 1959) treated this species as synonymy of *H. chinensis*, but recently many petridologists have considered them different from each other on morphology and geography (D. F. Brunton *et al.*, 1992; T. Nakaike, 1992; J. Z. Wang, 1990; R. C. Ching, 1981; H. S. Kung, 1980).

Lycopodium chinense Christ(in Fl. URSS. 1: 115. Tab. VI, 4a~b. 1934) may be a misidentification of this species. This species bears dense and narrower subulate leaves, which is different from *H. chinensis*.

3 南川石杉

Huperzia nanchuanensis (Ching et H. S. Kung) Ching et H. S. Kung in Ching in Acta Bot. Yunnan. 3(3): 302. 1981; H. S. Kung, Fl. Sichuan. 6: 28, pl. 1: 1~2. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 17. 1989; P. S. Wang, Pterid. Fan-jing Mt. 18. 1992; X. Y. Wang in Bull. Bot. Res. 14(4): 352. 1994.

Lycopodium nanchuanense Ching et H. S. Kung in H. S. Kung in Acta Phytotax. Sin. 18(2): 235, f. 1: 5, pl. 6: 2. 1980; B. Ollg. Index Lycop. 58. 1989. TYPE: China. Chongqing, Nanchuan, Mt. Jinfo, alt. 2000 m, under *Cathaya* forest, 1964, K. C. Kuan, W. T. Wang et C. L. Li 2081(PE).

H. hupehensis Ching, l. c. 301; Bartholomew *et al.* in Journ. Arn. Arb. 64(1): 17. 1983; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 14. 1989; C. M. Zhang in W. T. Wang, Keys Vasc. Pl. Wuling Mts. 5. 1995, syn. nov. TYPE: China. Hubei, Xuan'en, alt. 1300~1400 m, H. J. Li 5276(PE).

Hubei(湖北): Xuan'en(宣恩), H. J. Li(李洪均)5276. **Chongqing**(重庆): Nanchuan(南川), Sichuan Exp. 2081(=Kuan K. C. *et al.* 2081), Mt. Jinfo Exp.(金佛山队)314, 316, Z. Y. Liu(刘正宇)4507(PE), 134, 78409, H. S. Kung(孔宪需)5122(PYU), J. H. Xiong(熊济华)95370(SZ). **Yunnan**(云南): Zhengxiong(镇雄), W. M. Chu et G. F. Zhang(朱维明, 张光飞)24273(PYU).

Distribution Endemic to China (West Hubei, Chongqing and Northeast Yunnan); alt. 1300~2000 m; under forest, in moist soil or on tree trunk.

Xuan'en, Hubei, the type locality of *H. hupehensis* is a neighbouring area of the region where *H. nanchuanensis* is inhabited and its type specimen was collected.

Moreover, there are no distinct morphological features between these two species. So the former should be taken as a synonym of *H. nanchuanensis*. The species is characterized by its narrow lanceolate or less incurvate leaves.

4 曲尾石杉

Huperzia bucahwangensis Ching in Acta Bot. Yunnan. 3(3): 301. 1981; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 10. 1989; W. M. Chu et S. G. Lu in H. Li,

Fl. Dulongjiang Reg. 1. 1993; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993. TYPE: China. Yunnan, Buchawang, in valley, T. T. Yu 20132 (holotype, PE; isotype, KUN).

Yunnan(云南): Gongshan(贡山), T. T. Yu(俞德浚)20132; Jinping(金平), W. M. Chu(朱维明)1463(PE), 3733(PYU), Forest Exp. Team 4(森林四大队)300(PYU), S. K. Wu(武素功)3928(KUN).

Distribution Endemic to China(Yunnan); alt, 2300~2500 m in mosses under forest. The species is characterized by subulate and falcate leaves; it looks like *Dicranum*.

5 西藏石杉

Huperzia tibetica (Ching)Ching in Acta Bot. Yunnan. 3(3): 304. 1981; B. Ollg. in Opera Bot. 92: 165. 1987 et Index Lycop. 22. 1989; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993; W. M. Chu et S. G. Lu in H. Li, Fl. Dulongjiang Reg. 1. 1993.

Lycopodium tibeticum Ching in Bull. Fan Mem. Inst. Biol. Bot. ser. 10: 17. 1940; B. Ollg. Index Lycop. 74. 1989. TYPE: China. Yunnan, Salwin-Chiukiang dived, alt. 3100 m, 1938-09-16, T. T. Yu 20318(holotype, PE; isotype, PYU, KUN).

Yunnan (云南): Gongshan(贡山), T. T. Yu(俞德浚)22380, C. W. Wang(王启无)67229(PE, KUN); Mt. Gaoligong(高黎贡山), W. M. Chu et al. (朱维明等)22380 (PYU, CDBI), 22429(PYU).

Distribution Endemic to China(Northwest Yunnan); alt. 2700~3300 m; alpine moist meadow or swamp land.

The species is called "Tibetan Huperzia", though it does not occur in Tibet. Leaves are sparse(especially of taller individuals), plane margin and acute at the top.

6 伏贴石杉

Hupertzia appressa (Desv.) Löve et Löve in Bot. Not. 114: 34. 1961; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 9. 1989.

Lycopodium selago L. var. *appressum* Desv. in Mem. Soc. Linn. Paris 6(2): 180. 1827; Spring, Monogr. Lycop. 1: 20. 1842; Tagawa, Coll. Ill. Jap. Pterid. 8. 1959; B. Ollg. Index Lycop. 69. 1989. TYPE: La Pylaie s. n. (? P).

L. appressum (Desv.) Petr. Fl. Iakut. 1: 37. 1930; Iljin in Kom. Fl. URSS. 1: 115. 1934; C. M. Kuo in Taiwan 30: 11. 1985; B. Ollg. Index Lycop. 32. 1989, non F. Lloyd et L. Underw. 1900.

L. selago L. f. *reductum* Christ in Bull. Soc. Bot. Ital. 1897: 184. 1898.

Urostachys selago (L.) Herter f. *reductus* (Christ) Herter ex Nessel, Bärlappg. 37. 1939. TYPE: China. Shaanxi, Tsing-lin-shan, J. Giraldis. n.

L. selago L. f. *reductus-angustum* Christ, l. c.

U. selago (L.) Herter f. *reductus-angustinus* (Christ) Herter ex Nessel, l. c. 37. TYPE: China. Shaanxi, Mt. Taibai, J. Giraldis. n.

L. selago auct non L.: C. Chr. in Acta Hort. Gothob. 1: 108. 1924.

H. selago (L.) Bernh. ex Schrank et Mart. var. *appressa* (Desv.) Ching in Acta Bot. Yunnan. 3(3): 303. 1981 et in C. Y. Wu, Fl. Xizang. 1: 7. 1983; H. S. Kung, Fl. Sichuan. 6: 26, pl. 1: 3~5. 1988; J. Z. Wang in Journ. Hebei Forest. Coll. 5(2): 114. 1990, syn. nov.

Jilin(吉林): Mt. Changbai(长白山), J. J. Qian(钱家驹)483, 561(PE, KUN). **Shaanxi**(陕西): Mt. Taibai(太白山), P. C. Tsoong(钟补求)925, 988, K. T. Fu(傅坤俊)10369(PE). **Xinjiang**(新疆): Zhaosu(昭苏), Xinjiang Exp.(新疆队)10577, K. J. Guan(关克俭)3551, PE-717254; Nilka(尼勒克), 3986(PE). **Taiwan**(台湾): Taizhong(台中), S. J. Moore(牟善桀)12731(PYU). **Sichuan**(四川): Mt. Emei(峨眉山), X. J. Zhen(郑学经)4085(PYU, SZ). **Yunnan**(云南): Dali(大理), T. N. Liou(刘慎谔)21396(PE). **Xizang(Tibet)**(西藏): Baxoi(八宿), Qinghai-Xizang Exp. 73-1252(PE, KUN)

Distribution Northeast China, Northwest China, Southwest China and Taiwan; alt. 2300~5000 m, in alpine meadow or rock crevices. Also in Europe, Asia and N. North America.

The species is normally taken as a variety of *H. selago*. On account of its very small stature and the occurrence only in alpine regions, we regard it as a species here. It is an ecological substitute of *H. selago* in alpine regions.

Leaves are acuminate at the top and with involute margins.

7 相马石杉

Huperzia somai (Hayata) Ching in Acta Bot. Yunnan. 3(3): 301. 1981; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 21. 1989; Nakaike, N. Fl. Jap. Pterid. rev. enlarg. 792. 1992.

Lycopodium somai Hayata, Ic. Pl. Form. 5: 255. f. 91. 1915; Takeo, Ill. Form. Pl. Suppl. 15, f. 15. 1928; Tagawa, Coll. Ill. Jap. Pterid. 9. pl. 1~4. 1959; Devol in H. L. Li, Fl. Taiwan 1: 29. 1975; Nakaike, N. Fl. Jap. Pterid. 33, f. 33. 1982; C. M. Kuo in Taiwan 30: 11. 1985; B. Ollg. Index Lycop. 71. 1989; Iwatsuki, Ferns Fern Allies Jap. 44. pl. 2: 3. 1992; J. C. Tsai et W. C. Shieh in T. C. Huang, Fl. Taiwan 2nd ed. 1: 42. 1994. TYPE: China. Taiwan, Arisan, 1915, T. Soma s. n. (photo, PE, CDBI)

L. chinense Christ var. *somai* (Hayata) Masam. in Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 2: 114. 1934.

L. selago L. var. *somai* (Hayata) Masam. Short, Fl. Form. 32. 1936; Ohwi, Fl. Jap. Pterid. 8. 1957.

Urostachys somai (Hayata) Herter ex Nessel, Bärlappg. 54. 1939; B. Ollg. Index Lycop. 101. 1989.

Taiwan(台湾): Mt. Alishan(阿里山), T. Soma s. n. (photo, PE, CDBI).

Distribution China (Taiwan); Japan, Philippines.

The leaves of this species are elliptico-lanceolate, narrowing toward bases and with the middle part broadest.

8 红茎石杉

Huperzia rubicaulis S. K. Wu et X. Cheng in Acta Phytotax. Sin. 23(5): 400, f. 1. 1985; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 22. 1989; W. M. Chu et S. G. Lu in H. Li, Fl. Dulongjiang Reg. 1. 1993; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993. TYPE: China. Yunnan, Gongshan, alt. 1500 m, under forest in mosses, Qinghai-Xizang Exped. 82-9423(KUN).

Yunnan(云南): Gongshan(贡山), Qinghai-Xizang Exp. (青藏队)82-9423(KUN).

Distribution Endemic to China(Northwest Yunnan); alt. 1500 m, under forest.

The specise is close to *H. tibetica*, but it is taller than the latter and with smaller and reflex leaves.

9 雷波石杉

Huperzia laipoensis Ching in Acta Bot. Yunnan. 3(3): 299. 1981; H. S. Kung, Fl. Sichuan 6: 30. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 15. 1989. TYPE: China. Sichuan, Leibo, Huongmaogeng, alt. 2400 m, under forest on tree trunks, 1959-06-18, Sichuan Econ. Pl. Exp. LS. 725(PE).

Sichuan (四川): Leibo(雷波), Sichuan Econ. Pl. Exp. LS. (川经凉队)725, H. S. Kung(孔宪需)5404(CDBI).

Distrbution Endemic to China(South Sichuan); alt. 2300~2400 m; in moist soil under forests or on tree trunks.

The leaves of the specis are chartaceous and nondirective.

10 峨眉石杉

Huperzia emeiensis (Ching et H. S. Kung)Ching et H. S. Kung in Ching, in Acta Bot. Yunnan. 3(3): 299. 1981; H. S. Kung, Fl. Sichuan 6: 28, pl. 2: 13. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 15.1989; X. Y. Wang in Bull. Bot. Res. 14(4): 354. 1994; C. M. Zhang in W. T. Wang, Keys Vasc. Pl. Wuling Mts. 4. 1995.

Lycopodium emeiense Ching et H. S. Kung in Acta Phytotax. Sin. 18(2): 235, f. 1: 2. 1980; B. Ollg. Index Lycop. 44. 1989. TYPE: China. Sichuan, Mt. Emei, K. H. Yang 57467(holotype, PE; isotype, SZ)

L. chinense auct non Christ: X. J. Zheng in Acta Sci. Nat. Schol. Superi. Sin. (Biol.)1965(3): 274, f. 3. 1965.

Hubei (湖北): Hefeng(鹤峰), H. J. Li(李洪均)8670(PE). **Sichuan**(四川): Mt. Emei(峨嵋山), K. H. Yang(杨光辉)57467, X. J. Zheng(郑学经)4133(PE, SZ), W. C. Cheng(郑万均)s. n. (PE); Hongya(洪雅), s. coll. 1792, 3086(CDBI); Daxiangling(大相岭), H. S. Kung(孔宪需)3986(CDBI, PE); Nanchong(南充), Sichuan Econ. Pl. Exp. (川经南)50(PE); Luding(泸定), L. B. Zhang(张丽兵)1096(CDBI). **Chongqing** (重庆): Wuxi(巫溪), K. H. Yang 65342(PE). **Yunnan**(云南): Yongshan(永善), N. E. Yunnan Exp.(滇东北队)437; Yiliang(彝良), 593; Zhengxiong(镇雄), 1181(PE); Suijiang(绥江), W. M. Chu(朱维明)4963; Daguan(大关), 5172(PYU).

Distribution: Endemic to China(Hubei, Sichuan, Chongqing, Guizhou and Northeast Yunnan); alt. 800~2800 m; in moist soil under forest or in bush of valleys and beaches, or on rocks or trunks.

The type of the species is the specimen with the collection number K. H. Yang 57467 instead of W. C. Cheng s. n., which was wrongly cited by Ching(1981).

The species bears straight, nondirective and chartaceous leaves.

11 金发石杉

Huperzia quasipolytrichoides (Hayata)Ching in Acta Bot. Yunnan. 3(3): 299. 1981; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 19. 1989.

Lycopodium quasipolytrichoides Hayata, Ic. Pl. Form. 5: 252, f. 89. 1915; Takeo, Ill. Form. Pl. Suppl. 14. 1928; Tagawa in Acta Phytotax. Geobot. 14: 8. 1949; Devol in

H. L. Li, Fl. Taiwan 1: 29, pl. 2. 1975; C. M. Kuo in *Taiwania* 30: 11. 1985; B. Ollg. Index Lycop. 65. 1989; J. C. Tsai et W. C. Shieh in T. C. Huang, Fl. Taiwan 2nd ed. 1: 39, pl. 7. 1994. TYPE: China. Taiwan, Arisan, 1914-04, T. Ito et B. Hayata s. n. (holotype, TI; photo, CDBI).

Urostachys quasipolytrichoides (Hayata) Herter ex Nessel, *Bärlappg.* 64. 1939.

L. reflexo-intergrum Hayata, l. c. 254, f. 90. 1915. TYPE: China. Taiwan, Arisan, T. Soma s. n. (TI).

H. reflexo-integra (Hayata) Holub in *Folia Geobot. Phytotax.* 20: 76. 1985; B. Ollg. in *Opera Bot.* 92: 164. 1987 et Index Lycop. 19. 1989.

H. whangshanensis Ching et P. C. Chiu in Ching in *Acta Bot. Yunnan.* 3(3): 299. 1981; 蒋木青, 安徽植物志, 1: 19, fig. 3. 1985; B. Ollg. in *Opera Bot.* 92: 165. 1987 et Index Lycop. 23. 1989; C. M. Zhang in W. T. Wang, *Keys Vasc. Pl. Wuling Mts.* 4. 1995, syn. nov. TYPE: China. Anhui, Mt. Huangshan, P. C. Chiu 2570(PE).

11a 金发石杉 (原变种)

var. *quasipolytrichoides*

Anhui(安徽): Mt. Huangshan(黄山), P. C. Chiu(裘佩熹) 2532, 2570(PE). Taiwan(台湾): Ilan(宜兰), M. Tamura et T. Shimizu 20707(KUN); Taipei(台北), N. Fukuyama *et al.* 17744(PE).

Distribution Endemic to China (Anhui and Taiwan); in forest. Also in Japan.

The species is characterized by linear to narrowly lanceolate and reflex leaves.

11b 直叶金发石杉 (变种) 新组合

var. *rectifolia* (J. F. Cheng) H. S. Kung et L. B. Zhang, comb. nov.

H. whangshanensis Ching var. *rectifolia* J. F. Cheng in Fl. Jiangxi 1: 27, 505, f. 12. 1993. TYPE: China. Jiangxi, Xieshan, Y. G. Xiong 7105(isotype, JXU)

Jiangxi(江西): Xieshan(鞋山), Y. G. Xiong(熊耀国) 7105.

Distribution Endemic to China (Jiangxi); in mosses under forests.

The leaves of this variety differ from those of var. *quasipolytrichoides*.

12 小杉兰

Huperzia selago (L.) Bernh. ex Schrank et Mart. in Hort. Monac. 3: 1829; Trev. in Atti Soc. Ital. Sci. Nat. 7: 248. 1875; Rothm. in Fedd. Repert. Sp. Nov. 54: 59. 1944 et in Fl. Europ. 1: 3. 1964; Sen et Sen in Fern Gaz. 11(6): 415. f. 1: a-j. 1978; Ching in Acta Bot. Yunnan. 3(3): 302. 1981; C. Y. Yang in Acta Phytotax. Sin. 20(4): 446. 1982; Ching et S. K. Wu in C. Y. Wu, Fl. Xizang. 1: 7. 1983; Dixit, Census Ind. Pterid. 8. 1984 et Lycop. Ind. 42. 1988; B. Ollg. in Opera Bot. 92: 164. 1987 et Index Lycop. 20. 1989; J. Z. Wang in Journ. Hebei Forest. Coll. 5(2): 114. 1990; Fl. Xinjiang 1: 2. 1992; Nakaike, N. Fl. Jap. Pterid. rev. enlarg. 792. 1992.

Lycopodium selago L. Sp. Pl. 2: 1103. 1753; Grev. et Hook. in Bot. Misc. 2: 363. 1831 et 3: 104. 1833; Bak. Handb. Fern Allies 9. 1887; Hayata, Ic. Pl. Form. 4: 132. 1914; Iljin in Kom. Fl. URSS. 1: 114. 1934; 刘慎谔等, 东北草本植物志 1: 4, 图 3. 1958; Tagawa, Coll. Ill. Jap. Pterid. 8. pl. 1~2, f. 1: 3. 1959; Mehra et Bir in Res. Bull. Panjab Univ. 15(1~2): 101. 1964; Fl. Tsinling. 2: 15. 1974; Iwatsuki in Ohashi, Fl. E. Himal. 3: 167. 1975; Devol in H. L. Li, Fl. Taiwan 1: 29. 1975; Nakaike, N. Fl. Jap. Pterid. 29, f. 29. 1982; B. Ollg. Index Lycop. 69. 1989; Iwatsuki, Ferns Fern

Allies Jap. 44. 1992. TYPE: Linn. 1257. 10

Plananthus selago (L.) P. Beauv. Prod. Aeth. 112. 1805.

Urostachys selago Herter in Bot. Centralb. 39(2): 249. 1922 et Philipp. J. Sci. 22: 180. 1923; Nessel, Bärlappg. 32. 1939.

Mirmau selago (L.) H. P. Fuchs in Verh. Naturf. Ges. Basel 66: 43~44. 1955.

L. densum Lam. Fl. Franc. 1(Meth. anal.): 33. 1779.

L. abietiforme S. F. Gray, Brit. Pl. 2: 22. 1821.

Jilin(吉林): Mt. Changbai(长白山), Yanbian Exp. Team 1(延边一组)22(PE).

Xinjiang(新疆): Mts. Tianshan(天山), S. L. Chen(陈舜礼)300; Altay(阿勒泰), 385757(PE).

Distribution NW and NE China(Jiling and Xinjiang); alt. 1900~2300 m; under forests or near ditches; widely spreading in Europe, Asia, America and Australia

Stature of the species is much larger than that of *H. appressa*.

Uncertain Species

墨脱石杉

Huperzia medogensis Ching et Y. X. Ling in Acta Phytotax. Sin. 22(3): 193. 1984; B. Ollg. Index Lycop. 20. 1989.

Xizang(Tibet)(西藏): Medog(墨脱), W. L. Chen *et al.*(陈伟烈等)11549(Typus).

As described, the species holds entire leaves, so it belongs naturally to Sect. *Huperzia*. But we have not seen the type specimen, therefore cited here only.

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摘要 本文将石杉科石杉属(狭义)分为两组,即小杉兰组 Sect. *Huperzia* 和蛇足石杉组 Sect. *Serratae* (Rothm.) Holub, 对小杉兰组的概念进行了修订并对国产有关种类进行了分类学研究。共记载国产小杉兰组植物 12 种 1 变种, 并包括 1 个新组合: *Huperzia quasipolytrichoides* (Hayata) Ching var. *rectifolia* (J. F. Cheng) H. S. Kung et L. B. Zhang, 2 个新异名: *H. hupehensis* Ching 和 *H. whangshanensis* Ching et P. C. Chiu.

关键词 石杉属; 属下分类; 小杉兰组; 修订; 分类; 中国